

WHAT IS CLAIMED IS:

1. An electrodynamic machine, comprising:
  - a stator armature having armature winding means;
  - a wound rotor having a polyphase winding;
  - a damper winding on said wound rotor for permitting electric currents to be induced by changes in the magnetic flux linking the rotor magnetic field and the stator armature magnetic field, said electric currents flowing in such a direction as to oppose changes in magnetic flux linkages;
  - a brushless exciter for providing direct current power to the polyphase rotor winding to cause the machine to function in a synchronous mode of operation; and
  - a unidirectional device for providing a short circuit to the polyphase rotor winding to enable the machine to function in an induction mode of operation.
2. An electrodynamic machine according to claim 1, further including a direct current power source for supplying direct current power to the exciter.
3. An electrodynamic machine according to claim 1, wherein the unidirectional device includes at least a diode for providing the short circuit during the induction mode of operation and alternatively for blocking the short circuit during the synchronous mode of operation.
4. An electrodynamic machine according to claim 3, further including a unidirectional switching device connected in parallel with the diode for permitting current flow in parallel with the diode and in the opposite direction during the induction mode of operation.
5. An electrodynamic machine according to claim 4, further including a control circuit for rendering the unidirectional switching device conducting during the induction mode of operation.
6. An electrodynamic machine according to claim 4, wherein the unidirectional switching device is a silicon controlled rectifier.
7. An electrodynamic machine according to claim 3, wherein the exciter includes a polyphase winding and a diode bridge.

8. A method of making a synchronous generator, comprising:

providing a wound rotor with a polyphase winding for interacting electrodynamically with a stator armature having armature winding means to form an electrodynamic machine;

providing a damper winding on said wound rotor;

connecting said polyphase winding with a source of direct current to cause the machine to function as a synchronous motor or generator when the rotor rotates relative to the stator armature;

providing a damper winding on the wound rotor to enable inducing electric currents by changes in the magnetic flux linking the rotor magnetic field and the stator armature magnetic field, said electric currents flowing in such a direction as to oppose changes in magnetic flux linkages;

providing a brushless exciter for coupling the source of direct current power to the polyphase rotor winding to cause the machine to function in a synchronous mode of operation; and

providing a unidirectional device to cause a short circuit to the polyphase rotor winding to enable the machine to function in an induction mode of operation.

9. A method of generating alternating current, comprising:

using a wound rotor with a polyphase winding for interacting electrodynamically with a stator armature having armature winding means to form an electrodynamic machine;

using a damper winding on said wound rotor;

connecting said polyphase winding with a source of direct current to cause the machine to function as a synchronous motor or generator when the rotor rotates relative to the stator armature;

inducing electric currents by the damper winding by changes in the magnetic flux linking the rotor magnetic field and the stator armature magnetic field, said electric currents flowing in such a direction as to oppose changes in magnetic flux linkages;

using a brushless exciter for connecting the source of direct current to the polyphase rotor winding to cause the machine to function in a synchronous mode of operation; and

using a unidirectional device for providing a short circuit to the polyphase rotor winding to enable the machine to function in an induction mode of operation.

10. A method according to claim 9, further including supplying direct current power to the exciter.

11. An electrodynamic machine according to claim 9, further including providing the short circuit during the induction mode of operation and alternatively blocking the short circuit during the synchronous mode of operation.

12. An electrodynamic machine according to claim 9, further including permitting current flow in parallel with the unidirectional device and in the opposite direction during the induction mode of operation.

13. An electrodynamic machine according to claim 12, further including rendering a unidirectional switching device conducting during the induction mode of operation.

14. An electrodynamic machine according to claim 12, wherein the unidirectional switching device is a silicon controlled rectifier.

15. An electrodynamic machine according to claim 11, wherein the exciter includes a polyphase winding and a diode bridge.